Lateglacial hunter-gatherers in the Iron Gates

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A Brief Review of the Archaeological and Chronological Evidence

Keywords: Lateglacial, Epigravettian, hunter-gatherers, Iron Gates

Acknowledgements

We thank László Bartosiewicz for identifying the animal bones selected for AMS ^{14}C dating, and Andrei Soficaru of the 'Francisc I. Rainer' Institute of Anthropology of the Romanian Academy for permission to sample the human remains from Climente II and Cuina Turcului for AMS ^{14}C dating and stable isotope analysis.

Abstract

This paper provides an overview of the evidence for human occupation of the Iron Gates section of the lower Danube Valley during the Lateglacial period, between ca. 14.700 and 11.700 cal BP. Late or Final Epigravettian assemblages of chipped stone and bone artefacts were recovered in excavations in the 1950s and 1960s at three cave sites in the Romanian sector of the Iron Gates: Hoților, Climente II and Cuina Turcului. Radiometric and AMS ^{14}C dates from the sites fall mainly in the Bølling-Allerød interstadial. However, direct dates on human remains from Cuina Turcului raise the possibility of a continuation of the Epigravettian into the Holocene. The absence of ^{14}C dates for the Younger Dryas may be a function of the radiocarbon sampling strategy. Previous claims for the existence of Epigravettian occupations at open-air sites in the Iron Gates have yet to be substantiated.

Introduction

The Lateglacial period was part of a major global climate change event (Termination 1) that marked the end of the Last Glaciation. It began with an abrupt warming (the Bølling-Allerød) at 14.700 cal BP, followed by a return to colder conditions ca. 12.900 cal BP (the Younger Dryas) and a final rapid warming ca. 11.700 cal BP leading to the Holocene and the establishment of full interglacial conditions.

Several sites in the Iron Gates have produced evidence of hunter-gatherer occupation during the Lateglacial period (*fig. 1*). In this paper we provide a brief overview of the archaeological evidence and comment on the significance of new AMS ^{14}C dates on animal bones and human remains. We also reflect upon two important questions: (i) was settlement of the Iron Gates continuous through-

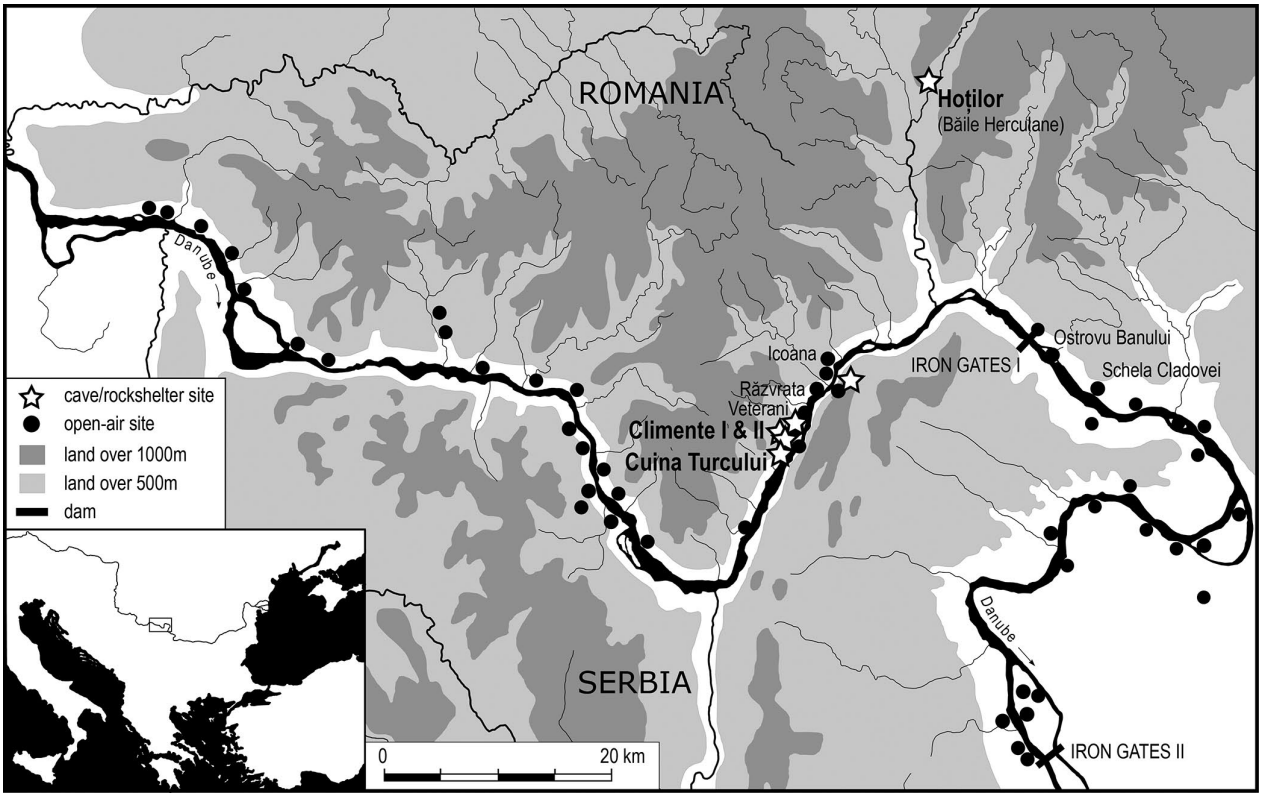

Fig. 1. Iron Gates sites with evidence of later Stone Age occupation. Named sites have a documented or presumed Epigravettian component.

out the period, (ii) are the archaeological remains that have been assigned to this period part of a unitary cultural entity?

Final Palaeolithic, Epipalaeolithic or Early Mesolithic?

Any discussion of the archaeology of the Iron Gates is made more difficult by inconsistent use of terminology (*fig. 2*).

Some authors have applied the terms 'Epipalaeolithic' to the Lateglacial hunter-gatherers of the Iron Gates and 'Mesolithic' to those of the Early Holocene (e.g. Păunescu 2000; Borić 2011). Others have tended to regard 'Epipalaeolithic' and 'Mesolithic' as synonyms and applied these terms either to the whole of the time-range from c. 15.000–8100 cal BP (e.g. Boroneanț 2000; Bonsall 2008), or restricted them to the Early Holocene denoting Lateglacial finds as 'Final Palaeolithic' (e.g. Mihailović 2008).

Inter-regional comparisons with better documented sequences in Italy and southwest France resulted in the introduction of cultural labels such as 'Azilian', 'Romanellian', 'Romanello-Azilian' and 'Tardigravettian' to characterize the Lateglacial finds from the Iron Gates, although these terms were largely abandoned elsewhere following Bartolomei et al.'s (1979) revision of the Late Upper Palaeolithic sequence in Italy and their use of the term 'Epigravettian' in place of Tardigravettian. For example, in their review of the European Upper Palaeolithic, Djindjian et al. (1999, 302–309) treat the Iron Gates sites as part of their 'Mediterranean Final Epigravettian' technocomplex.

Some Romanian archaeologists, whilst acknowledging the external parallels, have preferred to differentiate the Lateglacial assemblages from the Iron Gates by the use of the cultural label 'Clisurean', derived from a local name (Clisura Dunării) for the Romanian part of the Iron Gates gorge (e.g. Nicolăescu-Plopşor et al. 1965; Boroneanț 2000).

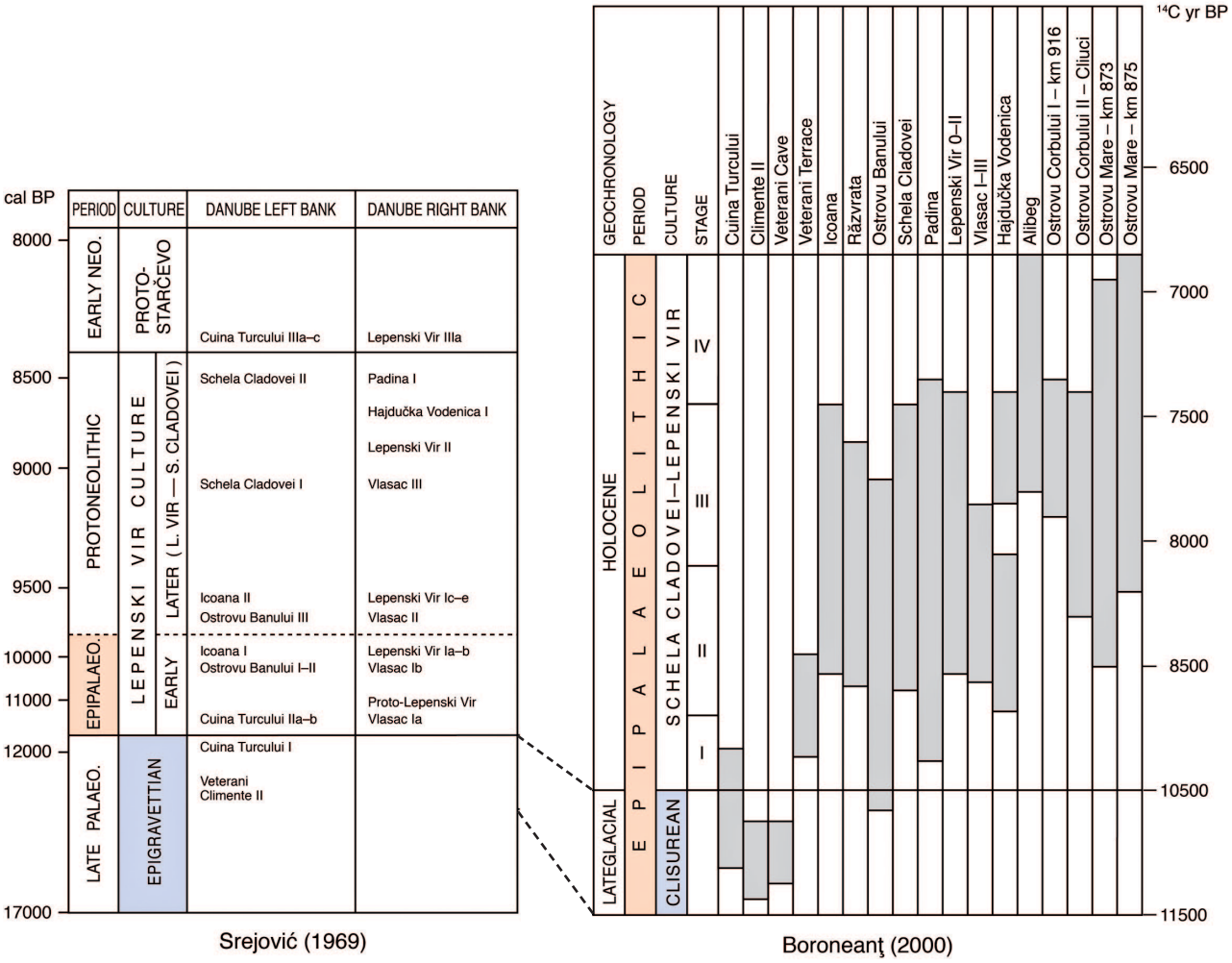

Fig. 2. Periodization, chronology and terminology of the later Stone Age in the Iron Gates, according to Srejović (1969) and Boroneanț (2000).

Site	Hor.	Original cultural designation	Formal tools	Debitage	Total	References
Cuina Turcului	I	'Romanello-Azilian'	1340	27,012	28,352	Păunescu 1970; 1978; 2000
Cuina Turcului	II	'Romanello-Azilian'	2022	42,240	44,262	Păunescu 1970; 1978; 2000
Climente II		'Late Epigravettian to Early Romanellian'	514	5864	6378	Boroneanț 1970
Ostrovul Banului	I–II	'Romanellian'	256	3337	3593	Boroneanț 1970
Hoților		'Azilian' / 'Clisurean'	86	978	1064	Nicolăescu-Plopşor/ Păunescu 1961; Nicolăescu-Plopşor et al. 1965; Păunescu 2002
Climente I		'Proto-Clisurean'	94	230	324	Boroneanț 1973

Tab. 1. Lithic artefact inventories from Epigravettian horizons (artefact totals after Păunescu 2000; 2002).

Epigravettian ('Clisurean') in the Iron Gates

Research undertaken in the second half of the twentieth century led to the recognition (or presumption) of Lateglacial occupations in a number of sites in the Iron Gates region (*fig. 1*). The first finds were made in the 1950s at Peștera Hoților (Thieves' Cave) at Băile Herculane in the valley of the river Cerna (Nicolăescu-Plopşor/Păunescu 1961). Most finds, however, were made at sites along the Romanian bank of the Danube between 1964 and 1969 during rescue excavations linked to the construction of the Iron Gates I dam. Epigravettian 'layers' were recognized in the rockshelter of Cuina Turcului and the cave sites of Climente I and II, as well as in the open-air site of Ostrovu Banului (Boroneanț 1970; 1973; Păunescu 1970; 1978). In several other sites, Epigravettian occupations were posited on the basis of artefact typology – at Veterani Cave by Boroneanț (1973; 2000), and at the open-air sites of Răzvrata, Veterani Terasă, Icoana and Schela Cladovei by Păunescu (1989; 2000). At none of these sites, however, is there supporting evidence of Lateglacial occupation from stratigraphy or radiocarbon dating (see Discussion).

Of the five 'main' sites, the most productive archaeologically was Cuina Turcului rockshelter where two 'Tardigravettian' horizons were distinguished (Cuina Turcului levels I and II) separated by sterile deposits. In at least one part of the cave the younger of these horizons (II) was subdivided into two levels (IIa and IIb), again separated by supposedly sterile deposits (Păunescu 1970; 1978; 2000). Above the Epigravettian deposits was another allegedly sterile horizon, overlain by deposits containing Early Neolithic (Starčevo-Criș culture) remains.

Finds attributed to the Epigravettian layers included more than 70.000 chipped stone artefacts, coarse stone tools, fragments of ochre and graphite, and abundant faunal remains including numerous artefacts made from bone, antler, tooth and shell. The chipped stone assemblage was predominantly of flint (96.8%) although other rock types (jasper, quartz/quartzite and obsidian) are represented. Some of the coarse stone tools were stained or 'painted' with red ochre. Among the bone tools are forms identified by Păunescu (2000) as awls, projectile points, chisels and a harpoon fragment. A significant number of bone tools were decorated with incisions forming abstract patterns including repetitive geometric designs (parallel lines, zig-zags, triangles and lozenges), short irregular lines (isolated or in groups) and simple hatching and cross-hatching sometimes framed between two parallel lines. Such decorations were applied mainly to bone; only two antler fragments with incised decoration were found. Also attributed to the Epigravettian horizons were 15 pierced animal teeth (deer, wolf and wild boar), two pierced fish vertebrae, and pierced shells of freshwater and marine molluscs. According to Păunescu (2000, 344) no consistent typological differences could be observed between the bone artefact assemblages from the two main Epigravettian horizons, although Srejović (1969, 14) argued that the geometric motifs belonged to an earlier phase than the hatched motifs.

Excavations in Climente II cave identified a layer up to 70cm thick, interpreted as belonging to the period 'from the end of the Epigravettian to the beginning of the Romanellian' (Boroneanț 1970, 2). From this layer were recovered nearly 6000 chipped stone artefacts, over 40 bone and antler artefacts (including a broken harpoon head and two decorated pieces), four pierced animal teeth (deer, wolf), a *Dentalium* shell, a number of river pebbles some of which were described as 'painted' with red ochre, and several lumps of red ochre and haematite (Boroneanț 1979, 176; Păunescu 2000, 368–372). Faunal remains from the same layer comprised those of large mammals (red deer, wild boar, brown bear), small mammals (beaver, fox, hedgehog), birds and fish (Păunescu 2000, 373).

The other sites where Epigravettian horizons were recognized produced much smaller amounts of material (*tab. 1*). At Climente I a 'proto-Clisurean' horizon (Boroneanț 1973) was identified in a 5.7 m thick sequence of deposits that also contained 'Mousterian', 'Aurignacian' and 'post-Palaeolithic' layers. A similar sequence was recorded in Peștera Hoților where a 10–15 cm thick 'Azilian' ('Clisurean') layer, within which were hearths and areas of darker soil containing charcoal and ash, occurred directly above an Aurignacian level (Nicolăescu-Plopşor/Păunescu 1961; Nicolăescu-

Plopşor et al. 1965). At Ostrovul Banului two 'Romanellian' levels were identified below deposits assigned to the Mesolithic 'Schela Cladovei culture' (Boroneanț 1970).

Human remains occurred in the Epigravettian deposits at Cuina Turcului and Climente II. At Cuina Turcului disarticulated remains were recovered from both the Epigravettian and Early Neolithic parts of the sequence. The 'Tardigravettian I' horizon produced two permanent molars, while bones from four individuals (three adults and a foetus) were attributed to the 'Tardigravettian IIa' horizon (Păunescu 1970; 1978). At Climente II bones of at least two individuals were recovered from different parts of the cave. They comprised (i) the articulated skeleton of an adult male lying on the left side with the legs tightly flexed and lacking the cranium, many of the bones being stained with red ochre; and (ii) some teeth and fragments of bones that 'seem to be from a child's skeleton' (Boroneanț 1979, 176).

In previous studies of these sites most attention was focused on the lithic assemblages, which were used both as a means of dating the sites and of establishing intra- and extra-regional comparisons. The most detailed accounts of the lithic assemblages from the Iron Gates Epigravettian sites were provided by Păunescu (2000; 2002) who inventoried the formal tools using the Upper Palaeolithic type list of Sonneville-Bordes and Perrot (1953; 1954; 1955; 1956a; 1956b). The results of his analyses for the eight largest assemblages are presented in tab. 2.

Păunescu also obtained radiometric radiocarbon dates from two sites (*tab. 3*). At Cuina Turcului the 'Tardigravettian I' horizon was dated by three radiometric ^{14}C measurements on pine charcoal ranging between 12.600±120 and 11.960±60 BP, while a radiometric date of 10.125±200 BP was obtained on a mixed sample of charcoal and burnt bone fragments from the 'Tardigravettian IIa' horizon (Păunescu 1970; 1978; 2000). From Peștera Hoților a radiometric date of 11.490±75 BP was obtained for burnt bones from a hearth (Păunescu 2002).

The present authors obtained new single-entity AMS radiocarbon dates as part of an ongoing re-evaluation of the pre-Holocene settlement of the Iron Gates. Tables 4–5 present results for human remains and humanly modified animal bones from Epigravettian levels at Climente II cave and Cuina Turcului. Dating of material from Climente II has proved especially difficult because of low collagen yield. Of a total of 13 samples submitted to the Oxford Radiocarbon Accelerator Unit, only six (two human, four ungulate) yielded sufficient collagen for dating.

Lab ID	Site	Context	Material	^{14}C age (BP)	Calibrated age (95% confidence)
Bln-803	Cuina Turcului	Layer I (Trench B 5.90–5.95m; hearth at base of layer.	Pine charcoal	12600±120	15290–14280 cal BP
Bln-804	Cuina Turcului	Layer I (Trench A 6.20–6.40m; hearth at base of layer.	Pine charcoal	12050±120	14205–13575 cal BP
GrN-12665	Cuina Turcului	Layer I (Trench S 5.70–5.88m; hearth at base of layer.	Pine charcoal	11960±60	14005–13595 cal BP
Bln-802	Cuina Turcului	Layer IIa (Intermediate A, 3.68-3.85m; hearth)	Charcoal, burnt bones	10125±200	12520–11210 cal BP
GrN-16987	Peștera Hoților	Sq. 3-4, 1.07–1.19m, S slope, hearth no. 3	Burnt bones	11490±75	13425–13160 cal BP

Tab. 3. Radiometric ^{14}C dates for Epigravettian levels at Cuina Turcului and Peștera Hoților.

SB-P no.	Tool type	Cuina Turcului level I		Cuina Turcului level II		Climente I		Climente II		Peștera Hoților		Ostrovul Banului		Icoana		Schela Cladovei	
		Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%
1	Simple endscraper	230	17.16	129	6.37			77	13.73	7	8.14	28	10.94	12	11.88	3	3.19
2	Atypical endscraper	66	4.93	58	2.87	2	2.12	21	3.74	2	2.33	8	3.13	16	15.84	3	3.19
3	Double endscraper	18	1.34	32	1.58			3	0.53			3	1.17				
4	Ogival endscraper	10	0.75	11	0.54			4	0.71	1	1.17	1	0.39				
5	Endscraper on retouched flake	20	1.49	28	1.38			18	3.21	5	5.82	2	0.78				
6	Endscraper on Aurignacian blade																
7	Fan-shaped endscraper	6	0.45	7	0.35			3	0.53			1	0.39	1	0.99		
8	Endscraper on flake	39	2.91	462	22.85	1	1.06	11	1.96			6	2.34	4	3.96		
9	Circular endscraper	111	8.28	195	9.64			23	4.10			16	6.25	6	5.94	12	12.77
10	Thumbnail endscraper	100	7.46	231	11.42			21	3.74	2	2.33	14	5.47	1	0.99		
11	Carinated endscraper	10	0.75	11	0.54			6	1.07	1	1.17	4	1.56	2	1.98		
12	Atypical carinated endscraper	15	1.11	4	0.2			3	0.53							2	2.13
13	Thick-nosed endscraper	4	0.3	3	0.15			5	0.89	1	1.17						
14	Flat-nosed (or shouldered) endscraper	7	0.52	4	0.2			6	1.07	2	2.33	2	0.78	1	0.99	1	1.06
15	Nucleiform endscraper	6	0.45	—	—			1	0.18								
16	Rabot																
17	Endscraper-burin	6	0.45	3	0.15												
18	Endscraper-truncated blade	4	0.3	2	0.1												
19	Burin-truncated blade	1	0.08	2	0.1					1	1.17	1	0.39				
20	Piercer-truncated blade	2	0.15	1	0.05												

SB-P no.	Tool type	Cuina Turcului level I		Cuina Turcului level II		Climente I		Climente II		Peștera Hoților		Ostrovul Banului		Icoana		Schela Cladovei	
		Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%
21	Piercer-endscraper	1	0.08	—	—											2	2.13
22	Piercer-burin	1	0.08	—	—												
23	Perforator	3	0.22	5	0.25			3	0.53	1	1.17						
24	Atypical perforator (bec)	7	0.52	9	0.44			8	1.43	1	1.17	2	0.78			3	3.19
25	Multiple piercer or bec	1	0.08	—	—					1	1.17						
26	Micro-perforator	4	0.3	1	0.05	1	1.06					1	0.39				
27	Dihedral straight burin	2	0.15	7	0.35	1	1.06	2	0.36	3	3.49	3	1.17	4	3.96		
28	Offset dihedral burin	2	0.15	6	0.3											7	7.45
29	Dihedral angle burin	3	0.22	8	0.39			2	0.36	3	3.49	2	0.78	2	1.98		
30	Angle burin on break	5	0.37	22	1.09			3	0.53	5	5.82	5	1.95	1	0.99		
31	Mulitple dihedral burin	1	0.08	3	0.15							1	0.39				
32	Burin busqué																
33	Parrot-beak burin																
34	Burin on straight re-touched truncation	1	0.08	4	0.2			1	0.18	1	1.17	1	0.39				
35	Burin on oblique re-touched truncation	2	0.15	3	0.15												
36	Burin on a concave truncation	1	0.08	1	0.05												
37	Burin on convex truncation							1	0.18								
38	Transverse burin on lateral reotuch							1	0.18								
39	Transverse burin on lateral preparation																

SB-P no.	Tool type	Cuina Turcului level I		Cuina Turcului level II		Climente I		Climente II		Peștera Hoților		Ostrovul Banului		Icoana		Schela Cladovei	
		Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%
40	Multiple truncation burin	1	0.08	3	0.15												
41	Multiple mixed burin	—	—	1	0.05												
42	Noailles burin																
43	Core-like burin	1	0.08	1	0.05												
44	Flat-faced burin																
45	Abri Audi type backed knife																
46	Chatelperron knife or point																
47	Atypical Chatelperron point																
48	Gravette point	3	0.22	11	0.54	5	5.33	4	0.71			2	0.78				
49	Atypical Gravette point	—	—	1	0.05												
50	Micro-gravette	20	1.49	59	2.92	3	3.19	12	2.14			14	5.47				
50a	Lamellar leaf point with bilateral retouch					5	5.33										
51	Truncated element															1	1.06
52	Font-Yves point																
53	Backed gibbous piece	4	0.3	4	0.2			3	0.53	1	1.17						
54	Fléchette																
55	Tanged point																
56	Perigordian shouldered point	—	—	1	0.05												
57	Shouldered piece	5	0.37	10	0.49			1	0.18			1	0.39				
58	Complete backed blade	13	0.97	14	0.69	2	2.12	4	0.71	1	1.17	1	0.39				
59	Partly backed blade	4	0.3	11	0.54	1	1.06	3	0.53								

SB-P no.	Tool type	Cuina Turcului level I		Cuina Turcului level II		Climente I		Climente II		Peștera Hoților		Ostrovul Banului		Icoana		Schela Cladovei	
		Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%
60	Piece with straight truncation	8	0.6	6	0.3			5	0.89	2	2.33	5	1.95	3	2.97		
61	Piece with oblique truncation	7	0.52	3	0.15							1	0.39				
62	Piece with a concave truncation	3	0.22	3	0.15			1	0.18								
63	Piece with convex truncation			3	0.15												
64	Double truncation							1	0.18								
65	Continuously retouched piece – one edge	52	3.88	13	0.64	2	2.12	9	1.60			2	0.78			7	7.45
66	Continuously retouched piece – two edges	10	0.75	3	0.15	3	3.19										
67	Aurignacian blade																
68	Notched or waisted Aurignacian blade																
69	Pointe à face plane																
70	Laurel leaf																
71	Willow leaf																
72	Solutrean shouldered point																
73	Pick																
74	Notched piece	25	1.86	33	1.63	5	5.33	22	3.92	2	2.33	8	3.13	2	1.98	3	3.19
75	Denticulated piece	8	0.6	23	1.14	3	3.19	15	2.67	1	1.17	2	0.78	3	2.97		
76	Splintered piece	46	3.43	60	2.97			18	3.21	3	3.49	22	8.59	19	18.81	25	26.60
77	Sidescraper	60	4.48	35	1.73	3	3.19	77	13.73	4	4.66	13	5.08	7	6.93	5	5.32
78	Raclette	76	5.67	38	1.88			25	4.46	5	5.82	21	8.20	17	16.83	3	3.19
79	Triangle	31	2.31	7	0.35			3	0.53	3	3.49	1	0.39				
80	Rectangle	1	0.08	5	0.25					1	1.17					1	1.06

SB-P no.	Tool type	Cuina Turcului level I		Cuina Turcului level II		Climente I		Climente II		Peștera Hoților		Ostrovul Banului		Icoana		Schela Cladovei	
		Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%	Σ	%
81	Trapeze	9	0.67	3	0.15			1	0.18	2	2.33	2	0.78				
82	Rhomb																
83	Lunate (segment of circle)	63	4.7	58	2.87			26	4.63	2	2.33	2	0.78				
84	Truncated bladelet	25	1.86	39	1.93			10	1.78	1	1.17	13	5.08			3	3.19
85	Backed bladelet	67	5	137	6.77	43	45.76	34	6.06	6	6.98	18	7.03			1	1.06
86	Truncated backed bladelet	20	1.49	32	1.58	1	1.06	4	0.71	2	2.33	2	0.78				
87	Denticulated backed bladelet	—	—	6	0.3			1	0.18							1	1.06
88	Denticulated bladelet	3	0.22	17	0.84			6	1.07			3	1.17				
89	Notched bladelet	35	2.61	57	2.82			7	1.25	2	2.33	9	3.52			1	1.06
90	Dufour bladelet	5	0.37	14	0.69	10	10.65	7	1.25	3	3.49	7	2.73			7	7.45
91	Azilian point	31	2.31	35	1.73	1	1.06	29	5.17	6	6.98	6	2.34			3	3.19
92	Divers	15	1.12	24	1.19	2	2.12	10	1.78	2	2.33						
	Totals:	**1340**		**2022**		**94**		**561**		**86**		**256**		**101**		**94**	

Tab. 2. Typological analysis of Epigravettian assemblages, based on Păunescu (2000; 2002). 'SB-P' refers to the type list of Sonneville-Bordes/Perrot (1953; 1954; 1955; 1956a; 1956b).

Site	Lab ID	Sample details	Context	Body position	^{14}C age (BP)	δ^{13}C (‰)	δ^{15}N (‰)	C/N	Corrected age BP	Calibrated age (95% confidence)
Climente II:	OxA-22042/24990	Burial 1, adult, male, L femur	Trench IV, sq. 2	Flexed	12565±37	-18.5	13.8	3.3	12220±58	14375–13925 cal BP
Cuina Turcului:	OxA-19203	'Individual 1', adult, female, L humerus	Trench M, 'Tardigravettian' level II	?	10435±45	-19.4	15.2	3.3	10003±71	11795–11245 cal BP
Cuina Turcului:	OxA-19202	'Individual 2' (687), adult, male?, 25–35yr, L ulna	Trench B, 'Tardigravettian' level II	?	10350±45	-19.3	15.2	3.3	9918±71	11695–11200 cal BP

Tab. 4. AMS ^{14}C dates for human remains from Epigravettian levels at Climente II and Cuina Turcului.

Lab ID	Year of excavation	Sample details	Context	^{14}C age (BP)	δ^{13}C (‰)	δ^{15}N (‰)	C/N	Calibrated age (95% confidence)
OxA-26310	1968	*C. elaphus*, bone (metatarsal), split	Trench I, 0.80m	11970±55	-20.3	6.3	3.2	14025–13625 cal BP
OxA-26199	1968	*C. elaphus*, bone (tibia), worked to a crude point	Trench III, sq. 1, 0.95m	11880±55	-19.0	2.5	3.2	13805–13555 cal BP
OxA-25735	1968	*C. elaphus*, antler, worked	Trench II, 0.65m	10900±50	-20.6	5.0	3.1	12875–12690 cal BP
OxA-26198	1968	*C. elaphus*, bone (metacarpal) with cutmarks	Trench II, 0.25m	10840±50	-20.6	5.4	3.2	12805–12680 cal BP

Tab. 5. AMS ^{14}C dates on humanly modified animal bones from Epigravettian deposits at Climente II.

Discussion

The Epigravettian evidence from the Iron Gates has some obvious limitations, arising partly from the 'rescue' nature of the original excavations. The work was often undertaken rapidly with limited resources and (in the case of the cave sites) without the benefit of artificial lighting. Consequently, recovery and recording methods were rather coarse grained. The problems have been compounded by the lack of detailed excavation reports for all sites except Cuina Turcului (Păunescu 1970; 1978).

Păunescu's typological analysis of the chipped stone assemblages (*tab. 2*) was accompanied by drawings of representative series of the formal tools from the various sites (Păunescu 2000, fig. 143–144, 146–148, 153, 156, 159, 161, 164, 165, 174, 211; 2002, 18). This dataset is used here for comparative purposes, but with some qualification. For example, Păunescu recognized 'carinated endscrapers' (SB-P #11–12) and 'Dufour bladelets' (SB-P #50) in many of the assemblages he assigned to the 'Tardigravettian'. Yet these types are rarely, if ever, present in Epigravettian assemblages elsewhere in Europe, being among the defining elements of Early Upper Palaeolithic Aurignacian industries. Most likely the 'carinated endscrapers' and 'Dufour bladelets' listed in tab. 2 are typological misidentifications, although stratigraphic mixing between Aurignacian and Epigravettian horizons at Peștera Hoților cannot be ruled out.

As will be evident from tab. 2, the three largest assemblages – from Cuina Turcului levels I and II and Climente II – share a number of specific tool types, including backed bladelets, Gravette points, micrograveltes, curved backed pieces (Azilian points), geometric microliths (lunates, triangles, trapezes and rectangles) and short endscrapers (especially thumbnail endscrapers). Combination tools, particularly double endscrapers – which are rare in later ('Mesolithic') contexts in the Iron Gates – also occur in all three assemblages. Individually, these types are not diagnostic, but in combination they are typical of the Late or Final Epigravettian in Southeast Europe (cf. Karavanić et al. 2013).

Backed bladelets, Azilian points, geometric microliths and thumbnail endscrapers are also present in the much smaller assemblage from Peștera Hoților, which is dated to the Lateglacial by a single radiocarbon determination. Likewise, the assemblage from Ostrovul Banului levels I–II contains Azilian points, geometric microliths, thumbnail endscrapers and double endscrapers; but in this case there are no supporting ^{14}C dates, which has led some researchers (e.g. Borić 2011, 165) to question whether this site actually contained an Epigravettian component.

The small assemblage from Climente I differs from the other sites. There are no thumbnail endscrapers or lunates, and only one (atypical) Azilian point. The formal tools include backed bladelets, Gravette points and what Păunescu de-

scribed as 'leaf points with bilateral retouch'. The last mentioned are conspicuously absent from the Epigravettian assemblages from Climente II, Cuina Turcului and Peștera Hoților. Păunescu found no equivalent in the SB-P typelist, and added them to the list as a new type (#50a). However, judging from the published illustrations (Păunescu 2000, fig. 153.17–20) they resemble fléchettes (SB-P #54) and generally the assemblage from Climente I has a Gravettian rather than Epigravettian aspect. It should be noted that initially V. Boroneanț (1968) and Păunescu (1973) interpreted the Climente I assemblage as 'Gravettian'. Both later revised their opinions, the latter describing it as 'Tardigravettian' (Păunescu 2000), and the former as 'Proto-Clisurean' (Boroneanț 2000) reflecting his view that it relates to an earlier period than the 'Clisurean' assemblages from Climente II, Cuina Turcului and Peștera Hoților.

The Epigravettian 'status' of the assemblages from Veterani Cave, Veterani Terasă, and the open-air sites of Răzvrata, Icoana and Schela Cladovei, which was based purely on artefact typology (Păunescu 2000), is equally insecure. The assemblages from these sites are small and lack many of the more definitive tool types found in the Epigravettian levels at Climente II, Cuina Turcului and Peștera Hoților. For example, from the presumed 'Tardigravettian horizon' at Icoana (cf. Păunescu 2000) there are no Gravette points, microgravettes, backed bladelets, Azilian points or geometric microliths, and only a single thumbnail endscraper, while among 94 'Tardigravettian' chipped stone tools from Schela Cladovei Păunescu identified just three Azilian points and one backed bladelet, but no Gravette points, microgravettes, geometric microliths or thumbnail endscrapers (*tab. 2*). More importantly, the large series of single-entity AMS ^{14}C dates on animal and human bones that have since been obtained for these two sites (25 from Icoana, and 58 from Schela Cladovei) provide no indication of hunter-gatherer occupation of either site in the Lateglacial or the very early Holocene (Bonsall 2008; Bonsall et al. 2015). A difference in age between Icoana and Cuina Turcului levels I–II had previously been suggested by Bolomey's (1973) comparative analysis of the faunal remains from the two sites summarized in fig. 3, the key features of which are: (i) the absence of ibex, moose and horse from Icoana; (ii) the preponderance of wild pig and red deer at Icoana and their relative scarcity at Cuina Turcului, and (iii) the absence from Cuina Turcului levels I and II of dog (*Canis familiaris*), which is thought to have been a Holocene ('Mesolithic') domesticate in the Iron Gates (Bökönyi 1975; Dimitrijević/Vuković 2015).

In their analysis of Late Epigravettian assemblages from the eastern Adriatic, Karavanić et al. (2013) observed a reduction in the frequencies of backed bladelets and microgravettes, and an increase in Azilian points and lunates through time. The evidence for temporal change in the Epigravettian of the Iron Gates is more limited, and not entirely consistent with that from the eastern Adriatic; the only stratigraphic sequence is from Cuina Turcului where the percentages of Azilian points, lunates and triangles decrease between levels I and II, but the frequency of backed bladelets actually increases.

Fig. 4 presents AMS and radiometric ^{14}C dates for Epigravettian levels in Iron Gates cave sites alongside the earliest dates for open-air sites. The dates for Climente II, Cuina Turcului level I, and Peștera Hoților all fall in the time range of the Bølling-Allerød interstadial, ca. 14.700–12.700 cal BP. The reservoir corrected ages of the human remains from level II at Cuina Turcului are significantly later and fall around the beginning of the Holocene. However, there is some doubt about the association of human remains and artefacts in level II (cf. Boroneanț 2011). If the human and other archaeological remains from level II were contemporaneous, then this would imply that the Epigravettian assemblage from this horizon dates wholly or in part to the initial Holocene rather than the terminal Pleistocene. If, on the other hand, the human bones were from burials inserted into pre-existing deposits, then the Epigravettian assemblage from level II could be largely or entirely pre-Holocene in age.

A continuation of Epigravettian techno-typological traits into the Holocene would not be surprising given the similarity of the chipped stone assemblage from Padina A1–A2 (e.g. the presence of Azilian points, geometric microliths, thumbnail endscrapers and occasional double endscrapers) with that from Cuina Turcului level II (Radovanović 1996, 238, fig. 5.5), and the radiocar-

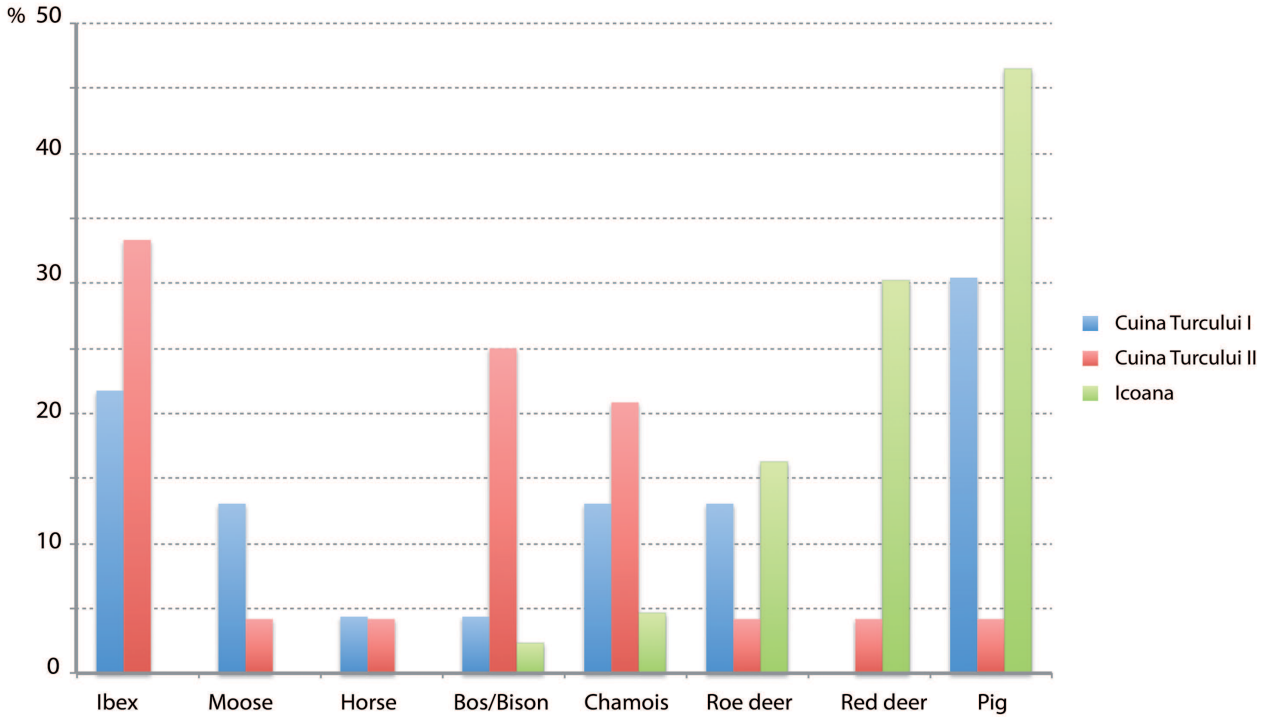

Fig. 3. Composition of the large-sized mammal assemblages from Cuina Turcului and Icoana (based on Bolomey 1973).

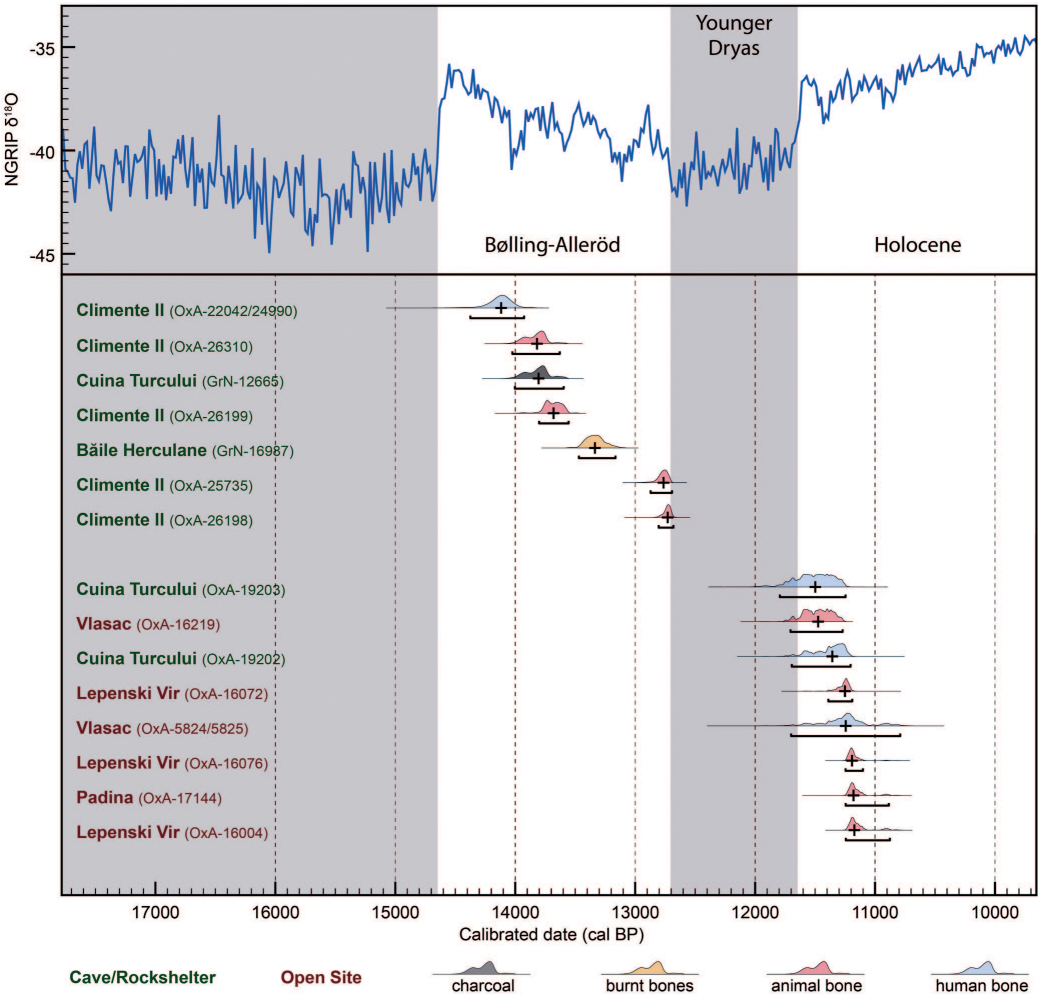

Fig. 4. Calibrated probability distributions of radiocarbon ages of archaeological samples from cave and open-air sites in the Iron Gates within the time range 15.000 to 11.000 cal BP, compared against the North Greenland (NGRIP) $\delta^{18}O$ ice record. Low precision dates (one-sigma errors greater than ±100 yr) have been omitted.

bon evidence of initial Holocene settlement at Padina (*fig. 4*; Borić/Miracle 2004). It should also be noted that some Final Epigravettian sites in Italy are radiocarbon dated to the early Holocene (Bietti 1990, 97).

A striking feature of fig. 4 is the absence of radiocarbon dates coinciding with the Younger Dryas cold event (ca. 12.700–11.700 cal BP). While this may represent a hiatus in the use of the rockshelter, such radiocarbon 'gaps' can also be the result of taphonomic factors or a function of the radiocarbon sampling strategy (cf. Mlekuž et al. 2008). It should be noted that all the animal bones dated from the cave sites (*tab. 5*) were red deer (*Cervus elaphus*), which was present in the Iron Gates region during the Bølling-Allerød interstadial and the Early Holocene but was likely rare or absent during the Younger Dryas. Ibex (*Capra ibex*), well represented in the faunal assemblages from levels I and II at Cuina Turcului (*fig. 3*), prefer more open habitats and are likely to have been more numerous than deer in the mountainous terrain surrounding the rockshelter during the Younger Dryas. Mihailović (2008, 15 f.) has even suggested that the survival of hunter-gatherers in the Iron Gates during the Younger Dryas would have been dependent on intensive hunting of ibex and chamois. Therefore, without AMS ^{14}C dates on ibex bones from the Epigravettian levels at Cuina Turcului it would be premature to conclude that there was no Younger Dryas occupation of the rockshelter.

Conclusions

Late or Final Epigravettian ('Tardigravettian') occupations were previously recognized in up to nine cave and open-air sites in the Iron Gates section of the lower Danube Valley. Our review of the typological, archaeofaunal, stratigraphic and radiocarbon evidence supports the existence of Lateglacial occupations in at least three sites: Hoților cave, Climente II cave and Cuina Turcului rockshelter. The 'proto-Clisurean' assemblage from Climente I cave may be Gravettian rather than Epigravettian, but this requires confirmation from radiocarbon dating. Likewise, the existence of an Epigravettian component in the open-air site on Ostrovul Banului, posited by V. Boroneanț and A. Păunescu on stratigraphic and typological evidence, requires support from radiocarbon dating. The case for Epigravettian occupations in Veterani Cave and at the open-air sites of Veterani Terasă, Răzvrata, Icoana and Schela Cladovei rested on ambiguous typological evidence, but has since been weakened by the acquisition of large series of AMS dates for Icoana and Schela Cladovei that suggest neither of these sites was occupied during the Lateglacial or very early Holocene.

Radiocarbon dates on animal and human bones from the Epigravettian levels in Hoților, Climente II and Cuina Turcului fall mainly in the Bølling-Allerød interstadial between 14.700 and 12.900 cal BP, although dates on human remains from the later of the two main Epigravettian levels at Cuina Turcului raise the possibility that the Epigravettian assemblages there are in part of Early Holocene age. The lack of ^{14}C dates corresponding to the Younger Dryas (12.900–11.700 cal BP) cold event may reflect a period when the cave sites were not used, or could be a function of the radiocarbon sampling strategy.

A striking feature of the Epigravettian assemblages from Cuina Turcului and Climente II is the presence of large numbers of bone tools, including many with incised decoration in various styles. Establishing a secure chronology for this material will be a priority in future research.

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